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REMARKS

Listing of the Claims in the 4/5/04 Amendment

As the Examiner correctly noted, the claim listing in the 4/2/04 amendment incorrectly listed claim 6 as "canceled" and claim 7 as "original". The present claim listing reflects Applicants' intent and the Examiner's interpretation by listing claim 6 as "original" and claim 7 as "canceled."

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claim 20 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, after the amendment of Claim 19, Claim 20 lacked antecedent basis for "polyvinyl butyral". As explained below, Applicants have amended Claim 20 to rewrite it in independent form. As a result, the term "toughening agent" has been substituted for "polyvinyl butyral". Support for this substitution may be found in Claims 1 and 19 as filed. The amendment renders moot the antecedent basis problem associated with "polyvinyl butyral". Applicants accordingly request the reconsideration and withdrawal of the rejection of Claim 20 under 35 U.S.C. § 112, second paragraph.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-6, 8-10, 16-18, 21, 22, and 24-27 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over European Patent Application No. 0 921 158 to Yeager et al. (hereinafter "Yeager") in view of U.S. Patent No. 4,196,116 to Haaf et al. (hereinafter "Haaf") or U.S. Patent No. 4,948,832 to Ostermayer et al. (hereinafter "Ostermayer"). Applicants respectfully traverse this rejection.

Yeager generally describes poly(phenylene ether) (PPE) thermoset compositions comprising polyphenylene ether, an allylic compound, at least one of a brominated epoxy compound and a mixture of a brominated and non-brominated epoxy compound, and at least one of a cure catalyst or a curing agent. Yeager abstract. Yeager mentions the use

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of an "additional thermoset or thermoplastic resin additive . . . for the purpose of improving properties such as toughness, impact strength or thermal stability." Yeager, page 9, lines 37-38. As acknowledged by the Examiner, no specific toughening agents are taught. 6/18/04 Office Action, page 4, paragraph 6.

Haaf generally describes compositions that include a polyphenylene ether resin, an alkenyl aromatic resin modified with an EPDM rubber, and a hydrogenated diblock copolymer. Haaf abstract. Haaf's compositions are thermoplastic compositions. See, e.g., Haaf at col. 3, lines 15-16. Notwithstanding the Examiner's statement to the contrary, Haaf's compositions are not "curable compositions". 6/18/04, page 4, paragraph 6. Haaf does not mention curing, and Haaf's working examples make clear that the compositions are used as blended (i.e., without curing). Haaf's hydrogenated diblock copolymers are chemically distinct from Applicants' Claim 1 toughening agents. To the extent that Haaf mentions hydrogenated A-B-A block copolymers in the background section (col. 2, lines 34-36), Haaf teaches away from the use of such compounds and toward the use of diblock copolymers.

Ostermayer generally describes a thermoplastic composition comprising a polyphenylene ether, a styrene polymer toughened with an acrylate rubber or with an unhydrogenated or hydrogenated polymer of a conjugated diene, a copolymer of styrene and a particular (meth)acrylate monomer, and a reinforcing agent. Ostermayer abstract (emphasis added). Contrary to the Examiner's assertion that Ostermayer's compositions are curable compositions, 6/18/04, page 4, paragraph 6, they are thermoplastic compositions. Ostermayer title, abstract. The materials useful for toughening the styrene polymer include, inter alia, "styrene/butadiene block copolymers, including A_nB, A_nB_n and A_nB_nA tapered block copolymers, star block copolymers and in particular (partially) hydrogenated block copolymers." Ostermayer, col. 3, ll. 15-19. In the working examples, the materials chosen for toughening the styrene polymer were copolymers of styrene and t-butyl acrylate, a copolymer of styrene and vinyltrimethoxysilane, a copolymer of styrene and γ -methacryloyloxypropyltrimethoxysilane, and a copolymer of styrene and γ -methacryloyloxypropyltrichoxysilane. Ostermayer, col. 6, ll. 15-44.

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Applicants' Claim 1 composition is a curable composition comprising, based on 100 weight percent of the resin portion of the composition: about 5 to about 50 weight percent of a poly(arylene ether) resin having a number average molecular weight of about 8,000 to about 13,000; about 50 to about 90 weight percent of a thermosetting resin selected from the group consisting of cyanate esters, polyesters, epoxy, benzoxazines, benzocyclobutene resins, and mixtures thereof; about 0.5 to about 15 weight percent of a toughening agent selected from the group consisting of poly(vinyl butyral-co-vinyl acetate) resins, partially hydrolyzed poly(vinyl butyral-co-vinyl acetate) resins, styrene-butadiene-styrene block copolymers, and styrene-ethylene-butylene-styrene block copolymers; and about 0.1 to about 7 weight percent of a cure agent. Thus, Applicants have selected particular toughening agents that function well in curable compositions comprising a majority of thermosetting resin, based on the total resin components.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Applicants respectfully assert that a prima facie case has not been established against Applicants' Claim 1 because (1) there is no motivation to combine Yeager with Haaf or Ostermayer, (2) even if there were a motivation to combine Yeager and Haaf, those references collectively fail to teach all Applicants' Claim 1 toughening agents, and (3) even if there were a motivation to combine Yeager with Haaf or Ostermayer, the combined references do not suggest or provide an expectation of success for Applicants' Claim 1 composition.

First, there is no motivation to combine Yeager with Haaf or Ostermayer. "When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references." *Ecolochem, Inc. v. Southern California Edison Co.*, 56 U.S.P.Q.2d 1065, 1073 (Fed. Cir. 2000). For one of ordinary skill in the art to be motivated to combine references, the references must be from analogous art areas. *In re Clay*, 966 F.2d 656, 658-659 (Fed. Cir. 1992). A secondary reference is analogous art with respect to a primary reference if the secondary reference is (1) from the same field of endeavor, regardless of the problem addressed, or (2) not from

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the same field of endeavor, but reasonably pertinent to the particular problem with which the inventor is involved. *Id.* at 658-659. As discussed above, Yeager relates to (curable) thermoset compositions, whereas Haaf and Ostermayer each relate to thermoplastic compositions. Thermoset compositions and thermoplastic compositions constitute different fields of endeavor because of their different constituent components (e.g., thermoset compositions contain substantial quantities of thermoset resins, whereas thermoplastic compositions do not; also, thermoset compositions typically tolerate much higher levels of fillers than thermoplastic compositions), different processing methods (e.g., sheet molding, bulk molding, and compression molding of thermoset compositions versus injection molding and blow molding of thermoplastic compositions), different properties (e.g., substantially higher modulus, higher glass transition temperature, and lower impact strength for thermoset compositions versus thermoplastic compositions), and different end uses (e.g., use of thermoset compositions to make dielectric materials used for circuit boards versus use of thermoplastic compositions to make blow molded automotive spoilers). Haaf and Ostermayer are also not pertinent to the particular problem with which the Applicants are involved, which is improving the toughness of thermoset adhesive compositions for use in circuit boards. In particular, the Haaf and Ostermayer compositions are not thermoset compositions and would not function as adhesives. Haaf and Ostermayer are therefore non-analogous art which one of ordinary skill in the thermoset polymer arts would have no motivation to combine with Yeager.

Second, even if there were a motivation to combine Yeager and Haaf, those references collectively fail to teach Applicants' Claim 1 toughening agents. Establishing a *prima facie* case of obviousness requires that all elements of the invention be disclosed in the prior art. *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A 1970). Applicants' Claim 1 toughening agents are "poly(vinyl butyral-*co*-vinyl acetate) resins, partially hydrolyzed poly(vinyl butyral-*co*-vinyl acetate) resins, styrene-butadiene-styrene block copolymers, styrene-ethylene-styrene block copolymers, and styrene-ethylene-butylenc-styrene block copolymers". Haaf teaches diblock copolymers, such as styrene-butadiene diblock copolymers, but Haaf does not teach the use of any specific triblock copolymers. To the extent that triblock copolymers are generally mentioned in the background section, Haaf teaches away from their use. The combination of Yeager and Haaf thus fails to teach all

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elements of Applicants' Claim 1, and Yeager and Haaf therefore do not support a prima facie case of obviousness against Claim 1.

Third, even if there were a motivation to combine Yeager with Haaf or Ostermayer, the combined references do not suggest or provide an expectation of success for Applicants' Claim 1 composition. For combined references to support a prima facie case of obviousness, "both the suggestion and expectation of success must be founded in the prior art, not in applicant's disclosure." *In re Dow Chem. Co. v. American Cyanamid Co.*, 527 F.2d 1226, 1228 (C.C.P.A. 1976). It is not sufficient for the combined references to suggest that it is obvious to try numerous possible choices where the art gives no indication of which choices are likely to be successful. *In re O'Farrell*, 7 U.S.P.Q.2d 1673, 1681 (Fed. Cir. 1988). Applicants respectfully suggest that the combination of Yeager with Haaf or Ostermayer is, at best, an impermissible "obvious to try" suggestion. As noted above, Haaf does not teach any of Applicants' specific Claim 1 toughening agents. To the extent that Ostermayer teaches styrene/butadiene ABA block copolymers, these materials are among many possible choices of rubbers used to toughen Ostermayer's styrene component, and they are not among the four types of rubber copolymers that Ostermayer actually used in his working examples. To suggest that one of ordinary skill in the art seeking to improve the toughness of thermoset adhesive compositions for circuit boards would turn to the thermoplastic compositions of Ostermayer and select styrene/butadiene ABA block copolymers for use as a toughening agent is an obvious-to-try suggestion motivated by impermissible hindsight. The combination of Yeager and Haaf or Ostermayer thus provides no reasonable suggestion or expectation of success for Applicants' claim 1 thermoset compositions comprising particular toughening agents.

For all of the above reasons, the combination of Yeager in view of Haaf and Ostermayer does not support a prima facie case of obviousness against Applicants' Claim 1. Given that Claims 2-6, 8-10, 16-18, 21, 22, and 24-27 each include or further limit the limitations of Claim 1, Applicants respectfully request the reconsideration and

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withdrawal of the rejection of Claims 1-6, 8-10, 16-18, 21, 22, and 24-27 under 35 U.S.C. § 103(a) over Yeager in view of Haaf and Ostermayer.

Claim 23 stands rejected under 35 U.S.C. § 103(a) over Yeager in view of Haaf or Ostermayer and further in view of U.S. Patent No. 5,397,822 to Lee, Jr. (hereinafter "Lee"). Applicants respectfully traverse this rejection.

Yeager, Haaf, and Ostermayer are discussed above.

Lee generally describes a thermoplastic resin composition having in admixture a polyphenylene ether resin and an elastomeric block copolymer wherin the block copolymer has in admixture a triblock copolymer A-B-A' and a diblock copolymer A-B with A and A' being polymerized vinyl aromatic hydrocarbon blocks such as styrene and B being an ethylene-alkylene block such as ethylene-butylene. Lee abstract. Lee teaches specific phosphate flame retardants, including "diphenyl phosphates of resorcinol." Lee, col. 8, lines 31-32. Lee does not teach any of Applicants' Claim 1 toughening agents.

Like Haaf and Ostermayer, Lee is nonanalogous art relative to Yeager. Lee relates to thermoplastic compositions and is therefore from a different field of endeavor than Yeager, which relates to thermoset compositions. Lee also is not pertinent to the particular problem with which the Applicants are involved, which is improving the toughness of thermoset adhesive compositions for use in circuit boards. Lee is therefore nonanalogous art that would not be combined with Yeager by one of ordinary skill in the art.

Applicants do not dispute that Lee teaches "diphenyl phosphates of resorcinol", which are pertinent to Applicants' Claim 23. However, Lee does not remedy the failure of Haaf to teach Applicants' Claim 1 toughening agents, nor does Lee remedy the failure of Yeager, Haaf, and Ostermayer to collectively suggest or provide an expectation of success for Applicants' Claim 1 compositions. Yeager, Haaf, Ostermayer, and Lee therefore fail to support a prima facie case of obviousness against Applicants' Claim 1, and it is axiomatic that the combined references cannot support a prima facie case of obviousness against Claim 23, which further limits Claim 1. Applicants therefore

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respectfully request the reconsideration and withdrawal of the rejection of Claim 23 under 35 U.S.C. § 103(a) over Yeager in view of Haaf and Ostermayer and further in view of Lee.

Allowable Subject Matter

Claims 19 and 37 stand objected to as being dependent upon a rejected base claim, but allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. 6/18/04 Office Action, page 5, paragraph 9. Claim 20 would be allowable if rewritten to overcome the rejection under 35 U.S.C. §112, second paragraph and to include all of the limitations of the base claim and any intervening claim. 6/18/04 Office Action, page 6, paragraph 9.

Claims 19 and 37 have been rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 20 has also been rewritten in independent form including all of the limitations of the base claim and any intervening claims. As discussed above, the rewriting of claim 20 has rendered moot the rejection under 35 U.S.C. §112, second paragraph.

Applicants thus believe that claims 19, 20, and 37 are now in allowable form.

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It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 07-0862 maintained by Assignee.

Respectfully submitted,

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